[0039]　According to a third aspect of the present invention an apparatus is provided which comprises a connection unit, and a processor configured to receive, via the connection unit, mobility information regarding a mobility state from a first network control element, and to replace a mobility state of the apparatus by the mobility state received in the mobility information upon preparing a handover from the first network control element to a second network control element.

[0040]　According to a fourth aspect of the present invention a method is provided which comprises

[0041]　providing a connection to a user equipment,

[0042]　detecting whether a handover of a user equipment is required,

[0043]　and, if a handover is required,

[0044]　establishing mobility information regarding the mobility state of the apparatus as mobility information of the user equipment, and

[0045]　sending the mobility information to at least one network element involved in the handover of the user equipment.

[0046]　According to a fifth aspect of the present invention a method is provided which comprises

[0047]　receiving mobility information regarding a mobility state of a user equipment, which is to perform a handover from a network control element to an apparatus carrying out the method, and

[0048]　using the received mobility information for preparing the handover of the user equipment.

[0049]　According to a sixth aspect of the present invention a method is provided which comprises

[0050]　receiving mobility information regarding a mobility state from a first network control element, and

[0051]　replacing a mobility state of the apparatus carrying out the method by the mobility state received in the mobility information upon preparing a handover from the first network control element to a second network control element.

[0052]　According to a seventh aspect of the present invention, a computer program product is provided which comprises code means for performing a method as set out in the above fourth to sixth aspects and modifications thereof when run on a processing means or module.

[0053]　Hence, according to aspects of the present invention, a mobility state of user equipment, which is about to perform a handover from a moving relay node to a fixed base station, is indicated based on the mobility state of the moving relay node. Hence, a handover from the moving relay node to the fixed base station can reliably be performed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0054]　These and other objects, features, details and advantages will become more fully apparent from the following detailed description of embodiments of the present invention which is to be taken in conjunction with the appended drawings, in which:

[0055]　FIG. 1 shows basis structures for a DeNB, an RN, a relay-UE and a target eNB according to general embodiments of the present invention,

[0056]　FIG. 2 shows a general relay system architecture,

[0057]　FIG. 3 shows a moving relay illustration for a high speed train scenario,

[0058]　FIG. 4 illustrates a scenario where a backhaul HO failure/rejection or partial admittance may take place.

DETAILED DESCRIPTION OF EMBODIMENTS

[0059]　In the following, description will be made to embodiments of the present invention. It is to be understood, however, that the description is given by way of example only, and that the described embodiments are by no means to be understood as limiting the present invention thereto.

[0060]　A general embodiment is described in the following by referring to FIG. 1, in which some examples for apparatuses according to embodiments are shown.

[0061]　FIG. 1 shows a relay node (RN) 2 as an example for an apparatus (which may be a relay node but also only a part thereof) according to a general embodiment of the present invention. The RN 2 comprises a first connection unit 22 configured to provide connection to a user equipment, and a processor 21. The processor 21 is configured to detect whether a handover of the user equipment (e.g., UE 3 shown in FIG. 1) is required, and, if a handover is required, to establish mobility information regarding the mobility state of the apparatus as mobility information of the user equipment, and to send the mobility information to at least one network element involved in the handover of the user equipment.

[0062]　The RN 2 may also comprise a memory 24 for storing data and programs, by means of which the processor 21 may carry out its corresponding functions. Furthermore, the RN 2 may comprise a second connection unit 23 for providing a connection to a network control element such as a donor eNB (DeNB) 1.

[0063]　Hence, according to general embodiments of the present invention, mobility information of a relay node currently serving a user equipment is provided to a network element which is involved in handover of the user equipment.

[0064]　This network element may be a base station of a target network, for example, so that this base station can apply the mobility state of the relay node to the user equipment. Alternatively (or in addition), the network element may be the user equipment itself. In this way, the user equipment can itself configure with the mobility state of the relay node.

[0065]　Hence, according to the general embodiments, it is assured that a handover of a user equipment from a moving relay node to a (fixed) base station can successfully carried out.

[0066]　An example for a base station of a target cell is a target eNB 4 shown in FIG. 1. The target eNB 4, which is an example for a corresponding apparatus, comprises a connection unit 42 and a processor 41. The processor 41 is configured to receive, via the connection unit, mobility information regarding a mobility state of a user equipment, which is to perform a handover from a network control element to the apparatus, and to use the received mobility information for preparing the handover of the user equipment.

[0067]　The target eNB 4 may also comprise a memory 43 for storing data and programs, by means of which the processor 41 may carry out its corresponding functions.

[0068]　An example for a user equipment (UE) described above is a UE 3 shown in FIG. 1. The UE 3, which is an example for a corresponding apparatus, comprises a connection unit 32 and a processor 32. The processor 32 is configured to receive, via the connection unit, mobility information regarding a mobility state from a relay node, and to replace a mobility state of the apparatus by the mobility state received in the mobility information upon preparing a handover from the first network control element to a second network control element.